

AMENDMENTS TO THE CLAIMS

1. (Original) A method for diagnosing disease in a patient comprising:
 - a. generating data for Raman, fluorescence, and diffuse reflectance spectra and images for a selected tissue of the patient;
 - b. providing data as a spectral library of tissue database classified by normal and diseased tissue for Raman, fluorescence and diffuse reflectance spectra and images for the same type of tissue; and
 - c. performing classification decisions to detect and identify diseased tissue by comparing the generated data from step a with the provided data in step b.
2. (Original) The method according to claim 1, with the additional step of:
 - d. displaying image and/or data results perceptible to a user as to the identification of the state of disease for the patient's selected tissue.
3. (Original) The method according to claim 1, wherein the generated data of step a is obtained by biopsy or direct optical measurement of the patient's tissue.
4. (Original) The method according to claim 1, wherein the data for the spectral library is developed from biopsy (ex vivo) or direct measurement (in vivo).
5. (Original) The method according to claim 1, comprising
 - (1). fusing the generated data for Raman, fluorescence, and diffuse reflectance of step a; and
 - (2). fusing the provided data for Raman, fluorescence, and diffuse reflectance of step b;wherein the fusing steps are performed prior to performing the classification decisions of step c.
6. (Original) The method according to claim 1, wherein time gating is used to reduce interferences from surface scattering and/or to reduce or remove interferences between Raman and fluorescence measurements.

7. (Original) The method according to claim 1, wherein time gating is used for depth profiling below the surface of tissue.
8. (Original) A method for diagnosing disease in a patient comprising:
- a. generating illumination light for Raman, fluorescence, and diffuse reflectance measurements;
 - b. illuminating a region of selected tissue of a patient with the light generated in step a;
 - c. generating data for Raman, fluorescence, and diffuse reflectance spectra and images from the illumination of selected tissue of the patient;
 - d. providing data as a spectral library of tissue database classified by normal and diseased tissue for Raman, fluorescence and diffuse reflectance spectra and images for the same type of tissue; and
 - e. performing classification decisions to detect and identify diseased tissue by comparing the generated data from step c with the provided data in step d.
9. (Original) The method according to claim 8, with the additional step of:
- f. displaying image and/or data results perceptible to a user as to the identification of the state of disease for the patient's selected tissue.
10. (Original) The method according to claim 8, wherein the generated data of step a is obtained by biopsy or direct optical measurement of the patient's tissue.
11. (Original) The method according to claim 8, wherein the data for the spectral library is developed from biopsy (ex vivo) or direct measurement (in vivo).
12. (Original) The method according to claim 8, comprising
- (1). fusing the generated data for Raman, fluorescence, and diffuse reflectance of step c; and
 - (2). fusing the provided data for Raman, fluorescence, and diffuse

reflectance of step d; wherein the fusing steps are performed prior to performing the classification decisions of step e.

13. (Original) The method according to claim 8, wherein time gating is used to reduce interferences from surface scattering and to reduce or remove interferences between Raman and fluorescence measurements.

14. (Original) The method according to claim 8, wherein time gating is used for depth profiling below the surface of tissue.

15. (Original) Apparatus for identifying and detecting the disease state of a patient's selected tissue comprising:

- a. means for generating light adapted to generate Raman, fluorescence, and diffuse reflectance spectra and images for a selected tissue of the patient;
- b. means for illuminating a region of a patient's tissue with the generated light;
- c. means for collecting light emanating from the illuminated tissue;
- d. means for providing Raman, fluorescence, and diffuse reflectance spectra and images in the collected light;
- e. a spectral library of Raman, fluorescence, and diffuse reflectance spectra and images representative of normal and diseased tissue; and
- f. a computer system for controlling light generation in a above, and detection and classification of the patient's tissue based on information from the means for detecting, and the spectral library.

16. (Original) Apparatus according to claim 15, comprising:

- (g). means for displaying data and/or images from the computer system, perceptible to a user as to the identification of the state of disease for the patient's selected tissue.

17. (Original) The apparatus according to claim 15, comprising

- (1). means for fusing the Raman, fluorescence, and diffuse reflectance spectra and images of means d; and
 - (2). means for fusing the spectral library Raman, fluorescence, and diffuse reflectance spectra and images; wherein the means for fusing are prior to the computer system performing the classification decisions.
18. (Original) The apparatus according to claim 15, comprising means for time gating data to reduce interferences from surface scattering and/or to reduce or remove interferences between Raman and fluorescence measurements.
19. (Original) The apparatus according to claim 15, means for time gating for depth profiling below the surface of tissues.
20. (Currently amended) A diagnostic [[Diagnostic]] device for the detection and identification of disease comprising:
[[apparatus including]] means for Raman, fluorescence and transreflectance measurements,
means for data computation of the measurements including spectral and image analysis, and
means for display of the data computation perceptible to a user [[for the detection and identification of disease]].
21. (New) The device according to claim 20, wherein the disease is cancer.
22. (New) A method for disease diagnosis in a patient comprising:
- (a). measuring a surface area or a surface volume of a patient with Raman, fluorescence, and transreflectance measurements;
 - (b). analyzing the Raman, fluorescence, and transreflectance measurements for disease; and
 - (c). displaying the analysis results to a user.

23. (New) The method according to claim 22, wherein the Raman, fluorescence, and transreflectance measurements are fused.

24. (New) The method according to claim 22, wherein the measurement is developed from biopsy (ex vivo) or direct measurement (in vivo).

25. (New) Apparatus for identifying and detecting disease in a patient comprising:

- a. sources of light for generating Raman, fluorescence, and diffuse reflectance spectra;
- b. a first rotating mirror interface for interfacing the light sources with a light guide;
- c. a tissue interface for illuminating a selected tissue of the patient with light from the first rotating mirror interface, and for sending impinging light from the selected tissue;
- d. a second rotating mirror interface for transferring the sent light from the tissue interface to spectral analysis and image modules;
- e. three spectral analysis and image modules for receiving light from the second rotating mirror interface, wherein one spectral analysis and image module comprises a non-imaging spectrometer with rotatable gratings;
- f. a third rotating mirror interface for splitting light from the non-imaging spectrometer with rotatable gratings into two beams of light;
- g. a time gated near infrared detector for detecting diffuse reflectance from one light beam of the third mirror interface; and
- h. a time gated ultraviolet/visible detector for detecting the second beam of the third mirror interface.

26. (New) The apparatus according to claim 25, wherein the tissue interface is a nonimaging contact fiber optic probe, an imaging fiber optic probe, an endoscope, and/or an imaging interface for a pathology microscope.